Listing of Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims **1-33** (canceled).

34. (Previously Presented) A plasma processing apparatus comprising:

a vacuum processing chamber having a substrate support therein centered on a central axis of the chamber;

a chamber wall enclosing a plasma processing space within the chamber proximate the substrate support, the chamber wall having a dielectric window therein centered on the central axis, the dielectric window having a vacuum chamber side and an outside;

an ICP source coupled to the chamber, the source including an RF power source outside of the chamber and means for coupling RF energy from the RF power source into the plasma processing space within the chamber in a spatially distributed ring, around and centered on the axis, in an alternating high and low plasma density distribution;

the means for coupling including an inductor outside of the chamber having a conductor formed of a sheet of electrically conductive material in the shape of at least one loop having opposite edges encircling the axis, the sheet having a gap extending between the opposite edges and defining a pair of terminal ends connected to the RF power source;

the opposite edges including an inner edge and an outer edge each having a plurality of cutouts therein, including inner cutouts in the inner edges and outer cutouts in the outer edges alternately spaced around the axis, that require RF current flowing between the terminal ends to flow around the outside of the inner cutouts and to flow around the inside of the outer cutouts, so as to concentrate near the cutouts RF magnetic fields extending into the plasma processing space to energize segments of high plasma density in the processing space in the alternating high and low plasma density distribution;

the cutouts in the outer edge extending sufficiently radially inward to interrupt the shortest current paths around the outside of the cutouts in the inner edge and the cutouts in the inner edge extend sufficiently radially outward to interrupt the shortest current paths around the inside of the cutouts in the outer edge;

the opposite edges thereby defining a sinuous serpentine conductive path that alternately curves inwardly around the outside of the cutouts in the inner edge and curves outwardly around the inside of the cutouts in the outer edge, in a plurality of oscillations between the terminal ends;

the at least one loop including a series of segments of alternating large and small cross-sections having widths generally parallel to the dielectric window and thicknesses generally perpendicular to the dielectric window.

35. (Currently amended) The apparatus of claim **34** wherein:

the spatially distributed ring of RF energy in the alternating high and low plasma density distribution includes inductively coupled energy from the small cross-section segments of the ~~element~~ inductor into the segments of high plasma density in the processing space.

36. (Currently amended) The apparatus of claim **34** wherein:

the spatially distributed ring of RF energy in the alternating high and low plasma density distribution includes inductively coupled energy from the small cross-section segments of the ~~element~~ inductor into the segments of high plasma density in the processing space in a plurality of rings having different radii from an axis of the chamber.

37. (Previously Presented) The apparatus of claim **34** wherein:

the cutouts are distributed in the material in an array defining the large and small cross-section segments of the inductor.

38. (Previously Presented) The apparatus of claim **34** wherein:

the cutouts are distributed in the material in a circular array of alternating inner and outer cutouts, spaced at equal angular intervals around the axis.

39. (Previously Presented) The apparatus of claim **34** wherein:

the cutouts are distributed in the material in an array of alternating inner and outer cutouts, spaced around the axis, with the shortest distance between adjacent inner and outer cutouts defining the small cross-section segments of the loop of the inductor.

40. (Previously Presented) An ICP source for a processing apparatus comprising:

an RF power source;

a dielectric window forming part of a chamber wall and having a vacuum chamber side and an outside; and

means for coupling RF energy from the RF power source into a plasma processing space within the chamber in a spatially distributed ring in an alternating high and low plasma density distribution;

the means for coupling including an electrical-circuit inductor on the outside of the dielectric window and generally congruent to the dielectric window, and a pair of terminal ends at opposite ends of the conductor, each terminal end having an RF connector fixed thereto coupling the conductor to the RF power source;

the inductor including an electrical conductor in the shape of at least one loop having a pair of opposite edges encircling an axis and providing a sinuous, oscillating, serpentine path around the axis that is between and defined by the opposite edges;

the opposite edges including an inner edge and an outer edge, each edge having a plurality of cutouts therein, alternately spaced in the inner and outer opposite edges, that require RF current flowing between the terminal ends to flow in an outwardly curving path segment around the outside of the cutouts in the inner edge and in an inwardly curving path segment around the inside of the cutouts in the outer edge so as to thereby concentrate magnetic flux around the conductor at the cutouts and extending through the dielectric window into the processing space to produce the plasma in the processing space within the chamber in the alternating high and low plasma density distribution.

41. (Previously Presented) The ICP source of claim **40** wherein:

the cutouts in the outer edge extend sufficiently radially inward to interrupt the shortest current paths around the outside of the cutouts in the inner edge; and

the cutouts in the inner edge extend sufficiently radially outward to interrupt the shortest current paths around the inside of the cutouts in the outer edge.

42. (Previously Presented) The ICP source of claim **40** wherein:

the conductor includes a series of lengths of alternating large and small cross-sections and widths;

the cutouts in the outer edge extend sufficiently radially inward to interrupt the shortest current paths around the outside of the cutouts in the inner edge; and

the cutouts in the inner edge extend sufficiently radially outward to interrupt the shortest current paths around the inside of the cutouts in the outer edge.

43. (Previously Presented) The ICP source of claim **40** wherein:

the conductor includes a series of lengths of alternating large and small cross-sections and widths, the widths being generally parallel to the dielectric window.

44. (Previously Presented) The source of claim **43** wherein:

the cutouts are distributed in the material in a circular array of alternating inner and outer cutouts, spaced at equal angular intervals around the axis.

45. (Previously Presented) The source of claim **43** wherein:

the cutouts are distributed in the material in an array of alternating inner and outer cutouts, spaced around the axis, with the shortest distance between adjacent inner and outer cutouts defining the small cross-section segments of the loop of the inductor.

46. (Previously Presented) An ICP apparatus comprising the ICP source of **40** and further comprising:

a vacuum processing chamber having a chamber wall having the dielectric window therein; and

the inductor being outside of the chamber.

47. (Previously Presented) An ICP source comprising:

an inductor having a conductor formed of a sheet of electrically conductive material in the shape of at least one loop having opposite edges encircling an axis, the sheet having:

a gap extending between the opposite edges and defining a pair of terminal ends, and

a pair of RF connectors, one fixed to each of the terminal ends; and

the opposite edges including an inner edge and an outer edge, each having a plurality of cutouts therein that require RF current flowing between the terminal ends to flow around the outside of the cutouts in the inner edge and around the inside of the cutouts in the outer edge, wherein:

the cutouts are alternately spaced in the inner and outer opposite edges,

the cutouts in the outer edge extend sufficiently radially inward to interrupt the shortest current paths around the outside of the cutouts in the inner edge,

the cutouts in the inner edge extend sufficiently radially outward to interrupt the shortest current paths around the inside of the cutouts in the outer edge;

the opposite edges thereby define a sinuous serpentine conductive path that alternately curves inwardly around the outside of the cutouts in the inner edge and curves outwardly around the inside of the cutouts in the outer edge, in a plurality of oscillations between the terminal ends; and

the at least one loop includes a series of segments of alternating large and small cross-sections and widths, the cutouts being distributed in an array of cutouts in alternate inner and outer edges around the axis, with the shortest distance between adjacent cutouts defining the small cross-section segments of the loop;

an RF power source connected across the ends of the conductor;

a dielectric window having a vacuum chamber side and an outside;

the inductor being outside of the dielectric window, generally congruent thereto, the widths being generally parallel to the dielectric window; and

means, including said inductor, for coupling RF energy through the dielectric window to form a plasma in a chamber having an alternating ring of high and low power density

segments in the chamber, with the small cross-section segments of the loop coupling energy into the high power density segments of the plasma and the large cross-section segments of the loop coupling energy into the low power density segments of the plasma.